Fugitive Dust Plan Schedule

Fugitive Dust Plan Table 1 Water Spray Systems

New water spray system installation

- Track Hopper
    - System installed and functional
    - *System Automation and Flow/Pressure Gauge*:
        - Pressure gauge installed
        - Flow meter installed by 8/14/2018 – Installed on 8/21/2018 time needed for generation of a purchase order and for contractor to be on site.
        - Instrumentation Electrical Connection by 8/17/2018 – Completed on 8/22/2018 time needed for generation of a purchase order and for contractor to be on site.
        - Connection to DCS by 8/21/2018 – Completed on 8/23/2018 time needed for generation of a purchase order and for contractor to be on site.
        - Automation in DCS by 8/22/2018 – Completed on 9/27/2018 time needed for receipt of electrical parts.
- Concentrate Storage
    - System installed and functional.
    - *System Automation and Flow/Pressure Gauge*:
        - Flow/pressure gauge installed
        - Instrumentation Electrical Connection by 8/28/2018 – Wiring was complete 8/28/2018. Circuit breaker was not energized until 9/6/2018 as the flowmeter was not registering flow and the issue had to be troubleshooted.
        - Connection to DCS via Radio Transmitter 9/14/2018 – Completed on 9/20/2018 as coordinating the programming between the radio and DCS took longer than originally estimated as the person doing the work was new at this task.
        - Automation in PLC completed on 9/4/2018
- Crushed Revert Storage & Furnace Silica Flux (Main Gate Bunker)
    - System installed and functional.
    - *System Automation and Flow/Pressure Gauge*:
        - Flow/pressure gauge installed
        - Instrumentation Electrical Connection complete
        - Connection to DCS is completed on 8/3/2018
        - Automation in PLC is complete
- Uncrushed Revert Bunker (Caliche Bank Bunker) – Note this storage bunker is rarely used to store material and often empty.
    - System installed and functional.
    - *System Automation and Flow/Pressure Gauge*:
        - Flow/pressure gauge installed
        - Instrumentation Electrical Connection 8/17/2018
        - Automation in PLC complete 8/21/2018 – Majority of the time these bunkers are empty and the sprays are controlled by the PLC via an operator push button when material is stored here.

        - Connection to DCS 8/23/2018 – Completed connection on 9/5/2018 as there was issues with the communications data registers between the PLC and DCS. The DCS gateway is a legacy unit that is close to its data limits. The PLC programmer had to find existing transferred points and do some reprogramming on a live system. Care was needed so as to not cause a breakdown in the existing processes.
- Smithco
    - System installed and functional.
    - *System Automation and Flow/Pressure Gauge*:
        - Flowmeter and pressure gauge installed by 8/22/2018 – Installed on 8/28/2018 time needed for generation of a purchase order and for installation contractor to be on site.
        - Instrumentation Electrical Connection by 8/24/2018 – Completed on 8/30/2018 time needed for generation of a purchase order and for installation contractor to be on site.
        - Connection to Radio Transmitter/Data Logger by 8/28/2018 – Completed on 9/21/2018 time needed for generation of a purchase order and for installation contractor to be on site. Coordinating the programming of radio and DCS took longer than originally estimated as the person doing the work was new at this task.

<u>Existing Water Spray System Modifications</u>

- Bedding Plant
    - System upgrades/modification complete and functional
    - *System Automation and Flow/Pressure Gauge*:
        - Flow/pressure gauge installed
        - Instrumentation Electrical Connection is complete
        - Automation in PLC is complete
        - Connection to DCS is completed on 8/3/2018
- Secondary Crusher
    - Conveyor #9 Modification
        - Sprays are complete, functional and are activated automatically via DCS/PLC based on tonnage through crusher
        - *Data recording and Flow Meter/Pressure gauge*:
            - Pressure gauge installed
            - Flow meter installed by 8/28/2018 – Completed on 8/27/2018
            - Instrumentation Electrical Connection to DCS by 8/31/2018 – Completed on 8/28/208
            - Data recording in database complete by 9/5/2018 – Completed on 8/30/2018
    - Conveyors 3 and 5 drop points
        - Sprays are already activated automatically via DCS/PLC based on tonnage through crusher
        - *Data recording and Flow Meter/Pressure gauge*:
            - Pressure gauge installed

- Flow meter installed 8/28/2018
- Instrumentation Electrical Connection to DCS by 8/31/2018 – Completed on 8/29/2018
- Data recording in database complete by 9/5/2018 – Completed on 8/30/2018, however, there were issues with getting a flow reading as the flow meter is located on a 2" water line and cannot read the low water flow rates through this water line. A smaller fitting was ordered to increase the water velocity so that a measurement can be made. It arrived on 10/15/2018. A new 1" pipe spool was constructed on 10/18/2018 and we have flow readings as of that date.

- Uncrushed Revert Storage
  - *System Automation and Flow/Pressure Gauge*
    - Temporary pressure gauge will be installed on 8/4/2018
    - Flow meter and permanent pressure gauge installed by 9/17/2018 – Installed on 9/4/2018
    - Motorized valve for automation purchased and installed by 9/17/2018
    - Instrumentation Electrical Connection to PLC by 9/20/2018 – Completed on 9/4/2018
    - Automation in PLC complete 9/5/2018
    - Connection to DCS 9/26/2018 - Completed on 9/5/2018
- Refractory Brick Crushing – Note this system has not operated for several years and not since the Fugitive Dust Plan was approved by EPA. Asarco will not operate the Refractory Brick Crusher until its water spray system is connected to the DCS and automated.
  - *System Automation and Flow/Pressure Gauge*
    - Flowmeter and pressure gauge installed by 9/17/2018 – Completed on 9/5/2018
    - Instrumentation Electrical Connection to PLC by 9/20/2018 – Completed on 10/15/2018.
    - Automation PLC complete 9/24/2018– Completed on 10/15/2018.
    - Connection to DCS 9/26/2018 – Measurement points configured and historized 9/5/2018. Actual live data recording began on 10/15/2018.

- Slag Reprocessed at Concentrator
  - *System Automation and Flow/Pressure Gauge*:
    - A temporary pressure gauge installed was installed on 8/4/2018
    - Flow meter and permanent pressure gauge installed by 9/17/2018 – Installed on 8/29/2018
    - Motorized valve for automation purchased and installed by 9/17/2018 – Installed on 8/29/2018
    - Instrumentation Electrical Connection to DCS via Radio Transmitter by 9/20/2018 – Completed on 9/24/2018
    - Automation in PLC complete 9/26/2018 – Completed on 9/24/2018

Long-Path Optical Density Monitor Installation (Fugitive Dust Plan Section 3 and Appendix A.5)

An order was placed for the 4 long-path optical density monitors on March 15, 2018 and the delivery time was quoted to be 6 weeks. Asarco did not receive the monitors by the quoted delivery time and made several attempts at contacting the manufacturer to get the monitors delivered (see below for correspondence timeline). Manufacturer stated that the monitors were shipped from the factory on July 13, 2018, and Asarco received monitors on-site on July 25, 2018. Physical and electrical installation of all four monitors was set to be completed by 8/14/2018. The monitors were set to be initially calibrated and output data stored and displayed on the DCS by 8/21/2018.

The opacity monitor located on the west entrance to the secondary crusher building began collecting and storing data in the DCS on 8/10/18. The opacity monitor located on the crusher repair bay entrance to the secondary crusher building began collecting and storing data in the DCS on 8/13/18. The opacity monitor located on the north entrance to the fine ore storage bins started collecting and storing data in the DCS on 8/15/2018. The opacity monitor located on the south entrance to the fine ore storage bins started collecting and storing data in the DCS on 8/20/2018.

Summary of Correspondence with Manufacturer

1) Email from Asarco to Vendor dated March 15, 2018, confirming order of 4 LM3189 Opacity Monitors with a quoted delivery time of 6 – 8 weeks after order is placed.
2) Email from Asarco to Vendor dated May 1, 2018, inquiring about the order shipment status. No response from vendor.
3) Email from Asarco to Vendor dated May 22, 2018, inquiring about the order shipment status. No response from vendor.
4) Email from Asarco to Vendor dated May 25, 2018, inquiring about the order shipment status. No response from vendor.
5) Email from Asarco to Vendor dated June 1, 2018, inquiring about the order shipment status. On June 4, 2018 the vendor responded that they would provide a shipment date.
6) Email from Asarco to Vendor dated June 13, 2018, inquiring about the order shipment status again as Asarco had not received a response. Later that day the vendor responded that they would provide a shipment date later that week.
7) Email from Asarco to Vendor dated June 28, 2018, inquiring about the order shipment status again as Asarco had not received a response. Later that day the vendor responded that they would ship the monitors by that Friday, June 29, 2018.
8) On July 13, 2018 Asarco finally received the Bill of Lading for the monitor shipment which stated that the monitors were shipped that same day instead of the June 29, 2018 as stated in prior communication with the vendor.
9) On July 25, 2018 Asarco received the monitors on-site.